



**U.S. Army
Environmental
Center**

**NO FURTHER ACTION
DECISION DOCUMENT
FOR STUDY AREA P51, ONE DRUM
NEAR WHITE POND ROAD,
SUDBURY TRAINING ANNEX**

FINAL DOCUMENT

CONTRACT DAAA15-90-D-0019

**U.S. ARMY ENVIRONMENTAL CENTER
ABERDEEN PROVING GROUND, MARYLAND**

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AMSL	- Above Mean Sea Level
Annex	- Fort Devens Sudbury Training Annex
BGS	- Below Ground Surface
CERCLA	- Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFHA	- Capehart Family Housing Area
CX	- Categorical exclusion
DOD	- U.S. Department of Defense
EM	- Electromagnetics
FEMA	- Federal Emergency Management Agency
FID	- Flame Ionization Detector
IRP	- Installation Restoration Program
MEP	- Master Environmental Plan
NEPA	- National Environmental Policy Act of 1969
NFADD	- No Further Action Decision Document
OHM	- OHM Remediation Services Corp., A Wholly-Owned Subsidiary of OHM Corporation
PA/SI	- Preliminary Assessment/Site Investigation
PCBs	- Polychlorinated Biphenyls
PID	- Photoionization Detector
POL	- Petroleum, Oil, or Lubricants
QM R&E	- Quarter Master Research and Engineering

GLOSSARY OF ACRONYMS AND ABBREVIATIONS
(CONTINUED)

RBC	- USEPA Region III Risk-based Concentration
ROTC	- Reserve Officer Training Corps
SARA	- Superfund Amendments and Reauthorization Act of 1986
SI	- Site Investigation
SI/RI	- Site Investigation/Remedial Investigation
SM	- Scanning Magnetometry
SMCLs	- Safe Drinking Water Act National Secondary Drinking Water Standards
TAL	- Target Analyte List
TCL	- Target Compound List
USAF	- U.S. Air Force
USAEC	- U.S. Army Environmental Center
USATHAMA	- U.S. Army Toxic and Hazardous Materials Agency
USEPA	- U.S. Environmental Protection Agency
USGS	- U.S. Geological Survey
µg/g	- Micrograms per gram
µg/l	- Micrograms per liter

EXECUTIVE SUMMARY

This decision has been prepared to support a no further action decision at Study Area P51, One Drum Near White Pond Road, at the Fort Devens Sudbury Training Annex in Middlesex County, Massachusetts. The report was prepared as part of the U.S. Department of Defense (DOD) Installation Restoration Program (IRP) to assess the nature and extent of contamination associated with site operations at the Sudbury Training Annex.

On February 21, 1990, the Sudbury Training Annex was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation, and Liability Action of 1989 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The U.S. Army Environmental Center (USAEC), formerly the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), initiated a Master Environmental Plan (MEP) in 1991. Study Area P51 was identified in the MEP as a potential area of concern. In July 1991, DOD, through USAEC, initiated a Site Investigation/Remedial Investigation (SI/RI) for the sixty-eight areas identified by the MEP. The SI/RI was conducted by OHM Remediation Services Corp. (OHM). Study Area P51 was included in the SI/RI.

The activities involved in the OHM investigation qualified for a categorical exclusion (CX) in accordance with National Environmental Policy Act (NEPA), as amended, and did not require prior preparation of an environmental assessment or an environmental impact statement. The investigation qualified for CX following criteria set forth in Appendix A of Army Regulation 200-2.

The Sudbury Training Annex, acquired by the government in the early 1940s during World War II, is located approximately two miles north of the town of Sudbury, Massachusetts. It has historically served as a munitions holding ground, an ordnance test station, a research and development facility, and as a troop training ground. Currently, the facility contains family housing for armed services personnel, a geophysical radar station, and guest houses.

SECTION 1.0 INTRODUCTION

This decision document has been prepared to support a no further action decision at Study Area P51, One Drum Near White Pond Road, at the Fort Devens Sudbury Training Annex in Middlesex County, Massachusetts. The report was prepared as part of the U.S. Department of Defense (DOD) Installation Restoration Program (IRP) to assess the nature and extent of contamination associated with site operations at the Sudbury Training Annex.

On February 21, 1990, the Sudbury Training Annex was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The U.S. Army Environmental Center (USAEC), formerly the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), initiated a Master Environmental Plan (MEP) in 1991. Study Area P49 was identified in the MEP as a potential area of concern. In July 1991, DOD, through USAEC, initiated a Site Investigation/Remedial Investigation (SI/RI) for the sixty-eight areas identified by the MEP. The SI/RI was conducted by OHM Remediation Services Corp. (OHM). Study Area P51 was included in the SI/RI.

The activities involved in the OHM investigation qualified for a categorical exclusion (CX) in accordance with National Environmental Policy Act (NEPA), as amended, and did not require prior preparation of an environmental assessment or an environmental impact statement. The investigation qualified for CX following criteria set forth in Appendix A of Army Regulation 200-2.

The Sudbury Training Annex, acquired by the government in the early 1940s during World War II, is located approximately two miles north of the town of Sudbury, Massachusetts. It has historically served as a munitions holding ground, an ordnance test station, a research and development facility, and as a troop training ground. Currently, the facility contains family housing for armed services personnel, a geophysical radar station, and guest houses.

SECTION 2.0 BACKGROUND AND PHYSICAL SETTING

The Sudbury Training Annex is located 20 miles west of Boston, 12 miles northwest of Natick, Massachusetts and 2 miles northwest of the town of Sudbury in Middlesex County, Massachusetts. The installation is located in the Maynard, Massachusetts 7½-minute United States Geological Survey (USGS) quadrangle map. Figure 2-1 presents the site map.

Military operations began at the Annex in 1942, when formal petition was filed by the United States to acquire the land by eminent domain (District Court of United States for District of Massachusetts, Misc. Civil No. 6507, March 25). Transfer of the property (3,100 acres) occurred on November 10, 1942, and initial use of the property, then known as the Maynard Ammunition Depot, was to store ammunition for subsequent shipment to the Port of Boston. The location was selected due to its strategic location (out of range of naval guns) and close proximity to four active railroad lines. Provision of safe storage of ammunition was attained by the construction of 50 earth-covered concrete bunkers located in the center of the Annex. Railroad spurs were developed to provide access between bunkers and the main railroad lines. The railroad spurs were removed in 1966 and no munitions have been stored within the Annex bunkers since 1975.

After World War II, the Maynard Ammunition Depot became known as the Maynard Ordnance Test Station, and in 1957 was acquired by the Quartermaster Research and Engineering (QM R&E) Center to relieve restrictions this command was experiencing at Natick, Massachusetts due to the continuous influx of new projects. The QM R&E used the Annex for testing various materials associated with its mission of research and development in the physical, behavioral, and biological sciences and engineering of clothing and protective equipment. Physical research and development included airdrop techniques, field shelters and equipment, field organization equipment, food, and food service systems. Scientific research and development uses included determination of the stability of various fungicides in materials exposed to outdoor environments, foamed plastics field tests, flame testing of clothing and equipment, toxic fumigant effects on insects, the study of climatic data in support of various test programs, and airdrop testing.

In 1982, custody of the entire Annex was transferred to Fort Devens, which is located 17 miles northwest of Sudbury in the town of Ayer, Massachusetts. The major mission of Fort Devens is to train active duty and reserve personnel, and to support the U.S. Army Security Agency Training Center and School, U.S. Army Reserves, National Guard, ROTC, and Air Defense sites in New England. The Annex presently supports this mission.

2.1 DESCRIPTION AND LAND USE

The 4.3-square-mile Annex is comprised of sections of the towns of Sudbury, Maynard, Hudson, and Stow. The installation is divided into two irregularly shaped parcels by Hudson Road. Approximately 500 acres in the northern parcel of the Annex are leased to the USAF for radar instrumentation. This facility, located near the Assabet River, is supervised by personnel from Bedford Research Laboratories. The Region One Office of FEMA leases approximately 262 acres on the northern parcel, near the East Gate. A relatively flat area on the northern parcel, consisting of approximately 30 acres, is presently used as a drop zone by the Airdrop Engineering Laboratory for testing equipment in actual parachute drops. A number of individual housing units are scattered across the northern parcel of the Annex. In the southern

parcel of the Annex, the Capehart Family Housing Area (CFHA), a military family housing area, occupies approximately 18 acres and includes a small recreational area for children.

The installation is also used by a number of local groups, including Army Reserve units, the National Guard, the Massachusetts State Police, and permitted recreational users. Because of its easy accessibility, the site is also used by unauthorized persons.

2.2 CLIMATE

Site-specific meteorological data are recorded at the USAF radar installation and at the Natick Weather Station on the southern parcel of the installation. A review of meteorological data indicates moderately cold, moist winters and warm, moist summers. July is recorded as the warmest month with a mean temperature of 22.2 degrees Celsius (72 degrees Fahrenheit). Temperatures at or above 27 degrees Celsius (81 degrees Fahrenheit) generally occur between the months of June, July, and August, with the possibility of temperatures dropping below freezing during the months of December through March. Late summer to early fall months bring the possibility of hurricane-influenced weather patterns.

Annual precipitation is moderately abundant with an annual mean of 121 centimeters (44 inches) per year. Winter precipitation is usually in the form of snow with occasional ice storms. Precipitation is, for the most part, distributed evenly throughout the year. The driest months are July and October with mean precipitation of 8½ centimeters (3.3 inches), and the wettest months are March and November with mean precipitation of 12 centimeters (4.7 inches).

Summer precipitation is usually confined to short duration, high intensity thunderstorms (frontal and convective). Winds are light to moderate throughout the year.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

2.3.1 Topography

The installation lies near the western boundary of the Seaboard Lowland Section of the New England-Maritime Physiographic Province. Elevations range from 321 feet above mean sea level (AMSL) along the northern boundary of the installation to 170 feet AMSL in Marlboro Brook on the southern parcel of the installation. The topography at the Annex is dominated by broad flat plains with elevations between 190 and 200 feet AMSL. Hills are scattered throughout the Annex, with most lying in an arc along the northern boundary and concentrated in the central section of the northern parcel. Topographic trends are generally north to south. A previous investigation classified the topographic features as follows: 81 percent lowlands, 16 percent hills, and 3 percent water bodies (USATHAMA, 1980).

2.3.2 Bedrock Geology

The Annex is underlain by igneous and metamorphic rocks of Pre-Cambrian(?) and Paleozoic Age. Six formations underlie the site as part of a tightly-folded, northeast-plunging asymmetrical anticline with a northeast-southwest strike. The Marlboro Formation, a fine-grained amphibolite schist (Pre-Cambrian?) is exposed on the Annex in a band extending from Vose Hill to White Pond. Two formations cross the southeast corner of the Annex: the Salem(?) gabbro-diorite and a quartz diorite facies of the Dedham granodiorite. Both formations are presumably of Devonian age. The Nashoba Formation (Carboniferous),

a light gray biotite gneiss, runs along the northern boundary of the site and underlies the extreme northwest corner of the Annex. Central and northern portions of the Annex are underlain by the Gospel Hill gneiss (Carboniferous). The Gospel Hill is a medium- to coarse-textured granite gneiss and is probably a granitized product of the Nashoba and Marlboro formations. Small bodies of the Assabet quartz diorite (Late Paleozoic?) crop out in northern portions of the site.

Bedrock across the site is closely folded with steep dips. Joints are common in the bedrock outcrops and are mostly vertical or nearly vertical. Joints at the surface were found to have a general northwestward trend. The occurrence and vertical orientation of the joints was confirmed at depth in the pilot hole near the northern boundary of the installation. All bedrock formations are dense and hard. No surface or subsurface indications of major faults were noted in the bedrock.

With the exception of widely-scattered outcrops, bedrock is covered by glacial deposits ranging in thickness from a veneer up to 120 feet. Field examination of the few outcrop locations and the results of the subsurface investigation indicated the bedrock surface to be highly irregular. Previous studies have indicated the existence of a buried bedrock valley beneath the southern parcel of the Annex and other abandoned stream channels in the area (Barnes, 1956).

2.3.3 Surface Geology

The surficial geology at the Annex is dominated by two glacial deposits: glacial till and outwash. Deposits of Recent age include alluvium and organic silt and peat.

Glacial till was deposited by the glacial ice sheet and rests directly on bedrock. When exposed at the surface, till forms both ground moraine and drumlins. As ground moraine, the till creates an irregular blanket on the bedrock surface. Tuttle Hill has been classified as ground moraine (Hansen, 1956). Till also forms drumlins, which are scattered across the Annex (Vose Hill, Hill 321, and Hill 235), and whose long axes have a crude northwesterly alignment.

Glacial till at the Annex is a compact, poorly sorted mixture of soil with grain sizes ranging from clay to boulders. Due to its compactness and poor sorting, till has a low permeability which retards the movement of ground water. At some locations at the Annex, however, the till was found to contain heavily oxidized fissures which greatly increased the flow of ground water.

Over most of the Annex, the glacial till is overlain by glacial outwash. The glacial outwash forms broad plains of well-stratified sand and gravel locally trenched by streams and pitted by shallow depressions containing lakes or swamps. Disregarding the soil zone and thin deposits of Recent age, the outwash is the uppermost deposit across nearly the entire installation.

The glacial outwash plains are of two major types: proglacial deposits and ice-contact deposits. Proglacial deposits were laid down by melt-water streams issuing from the ice margin. These deposits are fine to coarse textured and well stratified. Beneath this upper deposit is a lower zone composed chiefly of beds of gray, very fine sand and silt representing lake-bottom deposits. This lithologic sequence was encountered in the deep boring along White Pond Road, near Patrol Road. Ice-contact deposits on the Annex were laid down against the ice or in holes within the ice, forming roughly circular hills called kames. The stratification of the deposits ranges from poor to good, and the grains range in size from clay

to cobble. Examples of ice-contact deposits can be found near the northern and eastern boundaries of the Annex, where groups of kames have been closely spaced and form kame fields.

Recent deposits are relatively thin and restricted in distribution. They consist of alluvium composed of reworked outwash sand and gravel deposited along stream channels, of gray organic silt and peat deposited on lake bottoms and in swamps, and of loess-like deposits of uniform brown fine sand. The peat and organic silt locally retard the movement of water into or out of the outwash.

2.3.4 Soils

Generalized stratigraphic units prevalent across the site are soil, outwash, till, and bedrock. Weathering of the glacial deposits and the bedrock could have produced the existing soil, while in certain areas, erosion may have removed this soil. Surface soils developed on the kame landforms, the outwash plain, and the alluvium are sandy loam with lenses of gravel. Soils in the lowland swamps and bogs are composed of muck and peat. Soils developed on ground moraines and drumlins are stony loam.

2.3.5 Drainage

Glaciation has profoundly affected surface drainage at the site. Accumulation of glacial debris within the preglacial stream valleys has not only caused streams to alter their course, but in some places disrupted drainage entirely. Drainage on the Annex as a whole is poorly integrated as indicated by the numerous swamps, ponds, and small water holes. Previous geologic investigations have determined that the Assabet River once flowed across the Annex in a southeast trend from Boons Pond, beneath the southern shore of White Pond, and then curving to the northeast towards Hudson Road (Hansen, 1953). The cut of this earlier channel has been located at depths between 80 and 120 feet below ground level through seismic and test drilling surveys (Barnes, 1956; Perlmutter, 1962).

The northern parcel of the Annex lies within the drainage basin of the Assabet River, which flows along the northwestern perimeter of the installation. Taylor Brook, flowing north to the river, is the largest stream draining the area. Honey Brook, Taylor Brooks' major tributary, flows northeastward in a man-made channel along a bunker access path. The southern parcel of the Annex is within the drainage basin of the Sudbury River. The largest stream in the area, Marlboro Brook, flows southeastward from the former railroad classification yard towards the installation boundary.

2.3.6 Hydrogeology

The overburden water-bearing zone is a glacial deposit, consisting of glacial outwash, glacial till, and glacial moraine deposits. The glacial outwash is the most permeable zone and consists of stratified silt, sands and gravel. Ground water flow conditions within the outwash are controlled by changes in the surficial geology, the areal extent of the outwash, and by the less-permeable boundary conditions created by glacial till and bedrock. The glacial till is a dense, poorly sorted mixture of clay, silt, sand, gravel, and boulders. The till has a low hydraulic conductivity and does not provide an appreciable source of water (less than 10 gpm).

Bedrock is hydraulically connected with the overburden. Due to the composition of the bedrock and the slight fracturing observed in the rock cores, the bedrock water-bearing zone may have a very low primary and secondary porosity. This hypothesis is supported by previous studies (Perlmutter, 1962), and by the

low hydraulic conductivity values (2×10^{-5} ft/min) found during the OHM investigation. Although the bedrock does transmit water, the configuration and depth of the bedrock surface have greater influence of the ground water flow regime than does its water-yielding characteristics.

Depth to ground water is relatively shallow, ranging from flowing artesian conditions to 15 feet below ground surface (BGS). On topographic highs, the water table has been measured at depths to 30 feet BGS. The ground water elevation, hydraulic gradient, and flow direction roughly mimic ground surface topography and drainage.

The hydraulic conductivity of the overburden unit varies greatly across the Annex. The portions of the site with the highest permeability were near the southwestern boundary of the installation, and at the western side of the site, near Patrol Road and White Pond Road. The region with the lowest permeability was the eastern portion of the site, and the study areas around Puffer Pond. The highest hydraulic conductivity reported in the literature was from a location in a buried river valley beneath the southern parcel of the installation.

A pumping test was conducted on the abandoned Maynard water supply well installed within the buried valley (Perlmutter, 1962). The pumping test determined the overburden formation to have a hydraulic conductivity of 800 gpd/ft² (8×10^{-2} ft/min), with a storage coefficient of 0.20. Slug tests conducted during the OHM investigation in this vicinity produced results similar to those of the pumping test (2×10^{-2} ft/min).

In locations where the outwash is thick and permeable, the unit can yield approximately 100 gallons per minute. Results of a pump test performed in the 1970s on Maynard Town Well No. 3 reported well yields of 700 gpm.

2.4 STUDY AREA DESCRIPTION AND HISTORY

Area P51, One Drum Near White Pond Road, was identified by OHM during 1991. Historically, the vicinity of Area P51 was used to access bunker facilities used for ammunition storage during World War II.

2.5 RELATED INVESTIGATIONS

In 1978, the DOD established the IRP. Under the IRP, the DOD sought to identify, investigate, and clean up contamination from hazardous substances at federal facilities. Environmental investigations were started at the Annex in 1980 under the IRP in order to address the environmental impact of past land usage.

To date, the following organizations have conducted investigations at the Annex funded under the IRP:

- USAEC in 1980
- United States Army Environmental Hygiene Agency in 1983
- Dames & Moore of Bethesda, Maryland in 1986 and 1991
- OHM, Final Master Environmental Plan in 1992
- OHM, Site Investigation/Remedial Investigations in 1993.

A number of other investigations have been performed at the Annex. NUS Corporation (1985/1987), as a contractor to USEPA, conducted a preliminary assessment/site investigation (PA/SI) at the site in fulfillment of the requirements of CERCLA. SEA Consultants, Inc. (1991) conducted an environmental assessment/ environmental impact study for the Massachusetts Air National Guard at the western boundary of the Annex. GZA Geoenvironmental (1991) conducted a site investigation near the eastern boundary of the Annex, as a contractor to the U.S. Army Corps of Engineers, under the Defense Environmental Restoration Program.

The Site Investigation/Remedial Investigation Report (OHM, 1993) presents a summary of the investigations conducted by each of the above organizations. The following sections present a summary of the investigations conducted in Study Area P51.

2.5.1 Facility Investigation

A facility investigation was performed by Dames & Moore in 1984. The investigation was conducted to identify the potential of contaminant migration off site and included the collection of one surface water samples near Area P51. Results of the Dames & Moore sampling are summarized in Section 4.0.

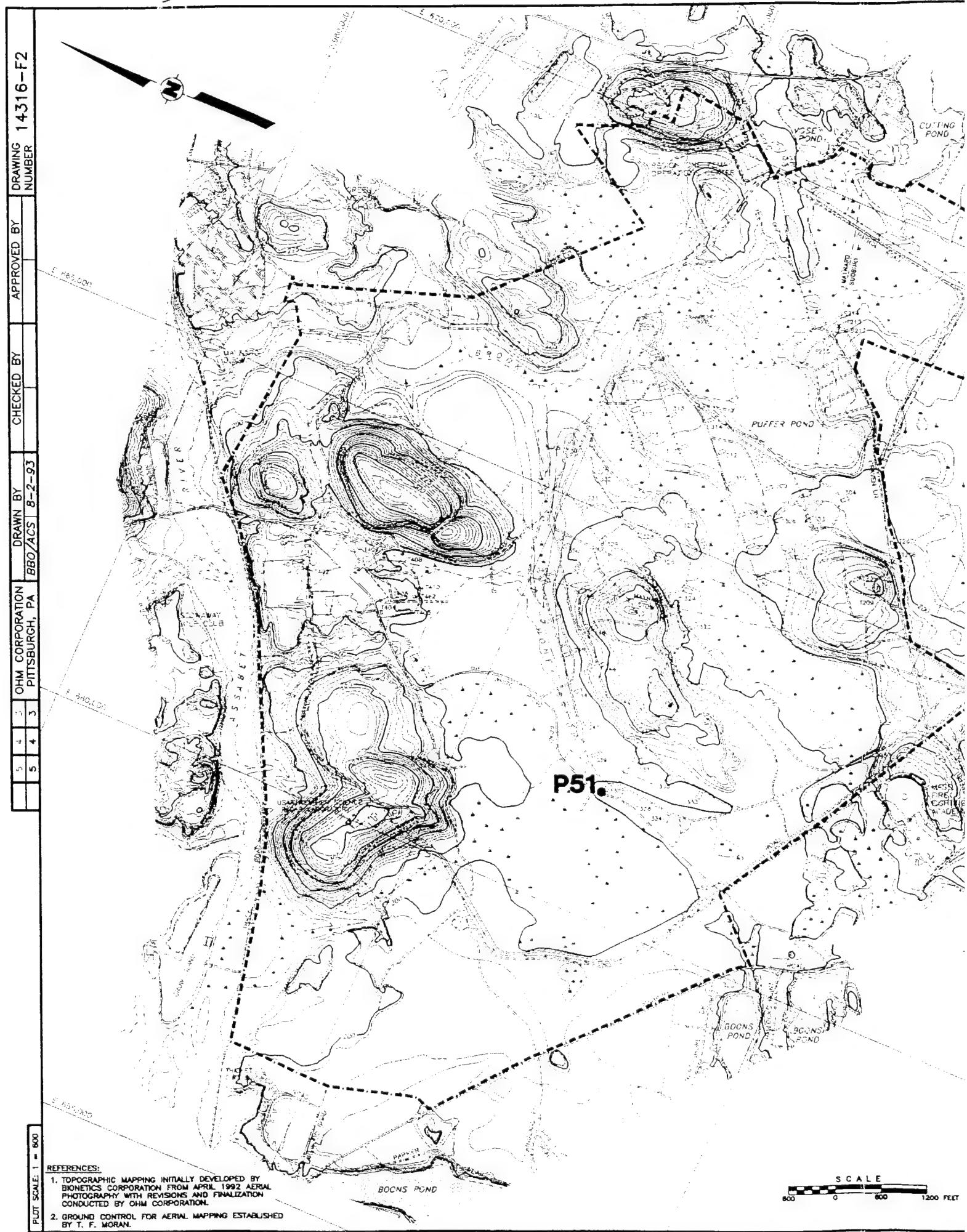
2.5.2 Master Environmental Plan

The MEP was initiated in 1991 as part of the IRP action at the Annex. The MEP was completed by OHM in 1992, under direct contract to USAEC, and listed sixty-eight study areas. One Drum Near White Pond Road was designated as Study Area P51.

The study conducted under the MEP consisted primarily of a review of existing studies and identification of potential environmentally significant areas. Area P51 was designated as a possible area of contamination and the MEP recommended that an area reconnaissance be performed.

2.5.3 Site Investigation

A site investigation (SI) was performed at Area P51 by OHM under contract to USAEC. The SI was initiated in 1991 and was completed in 1992. The purpose of the investigation was to identify contamination that may have resulted from use of the area and to determine the nature and extent of related contamination. The technical approach and the results of the SI for this area are presented in Section 4.0.



REFERENCES:

1. TOPOGRAPHIC MAPPING INITIALLY DEVELOPED BY BIONETICS CORPORATION FROM APRIL 1992 AERIAL PHOTOGRAPHY WITH REVISIONS AND FINALIZATION CONDUCTED BY OHM CORPORATION.
 2. GROUND CONTROL FOR AERIAL MAPPING ESTABLISHED BY T. F. MORAN.

PLUT SCALE: 1 = 600

A horizontal scale bar with the word "SCALE" at the top. Below it are four tick marks: a short black line labeled "600", a longer white space labeled "0", another short black line labeled "600", and a final long black line labeled "1200 FEET".

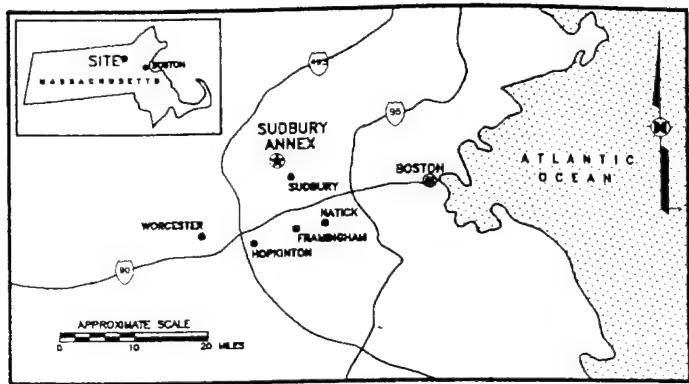
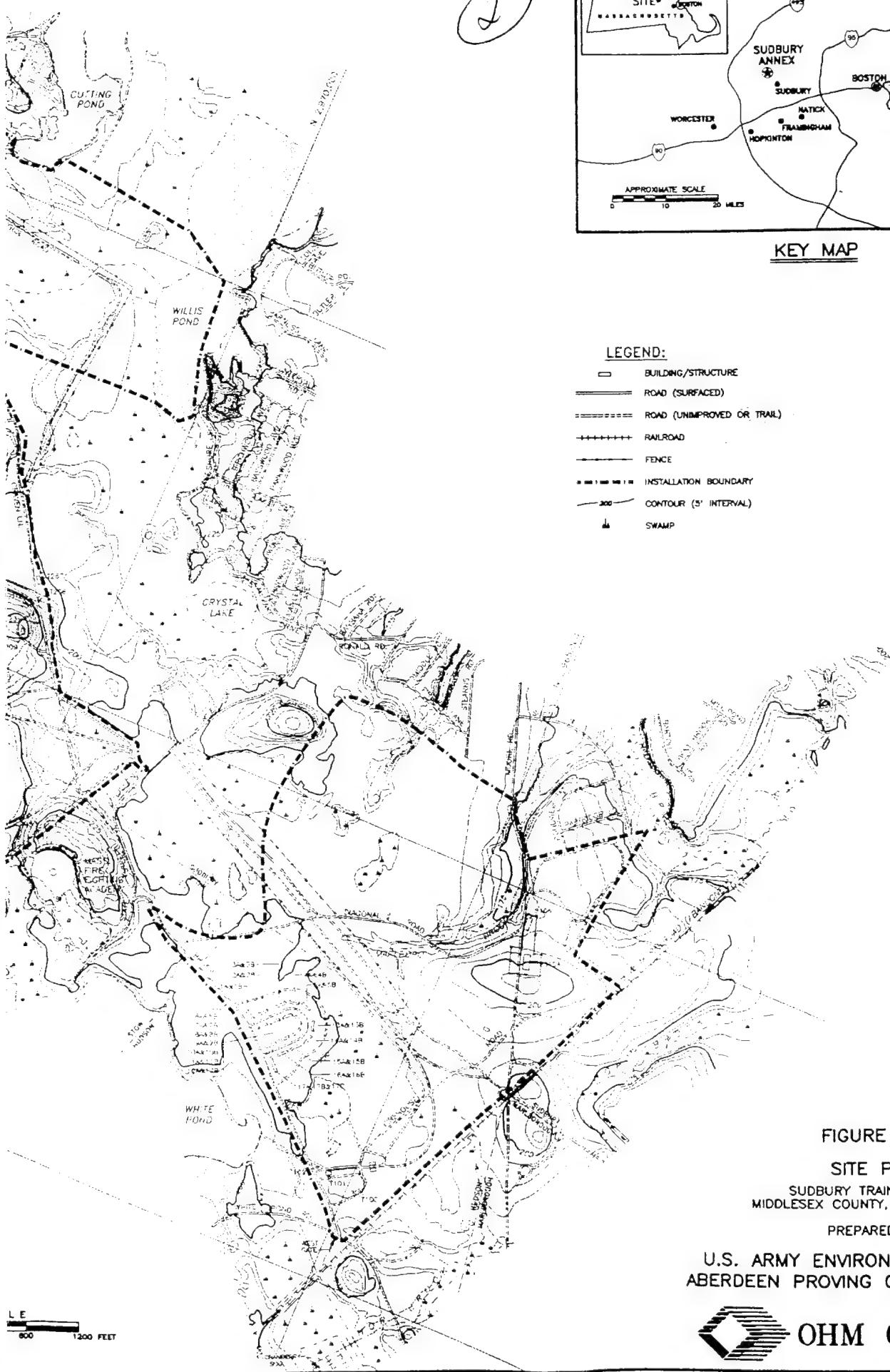


FIGURE 2-1
SITE PLAN
SUDBURY TRAINING ANNEX
MIDDLESEX COUNTY, MASSACHUSETTS
PREPARED FOR
U.S. ARMY ENVIRONMENTAL CENTER
ABERDEEN PROVING GROUND, MARYLAND

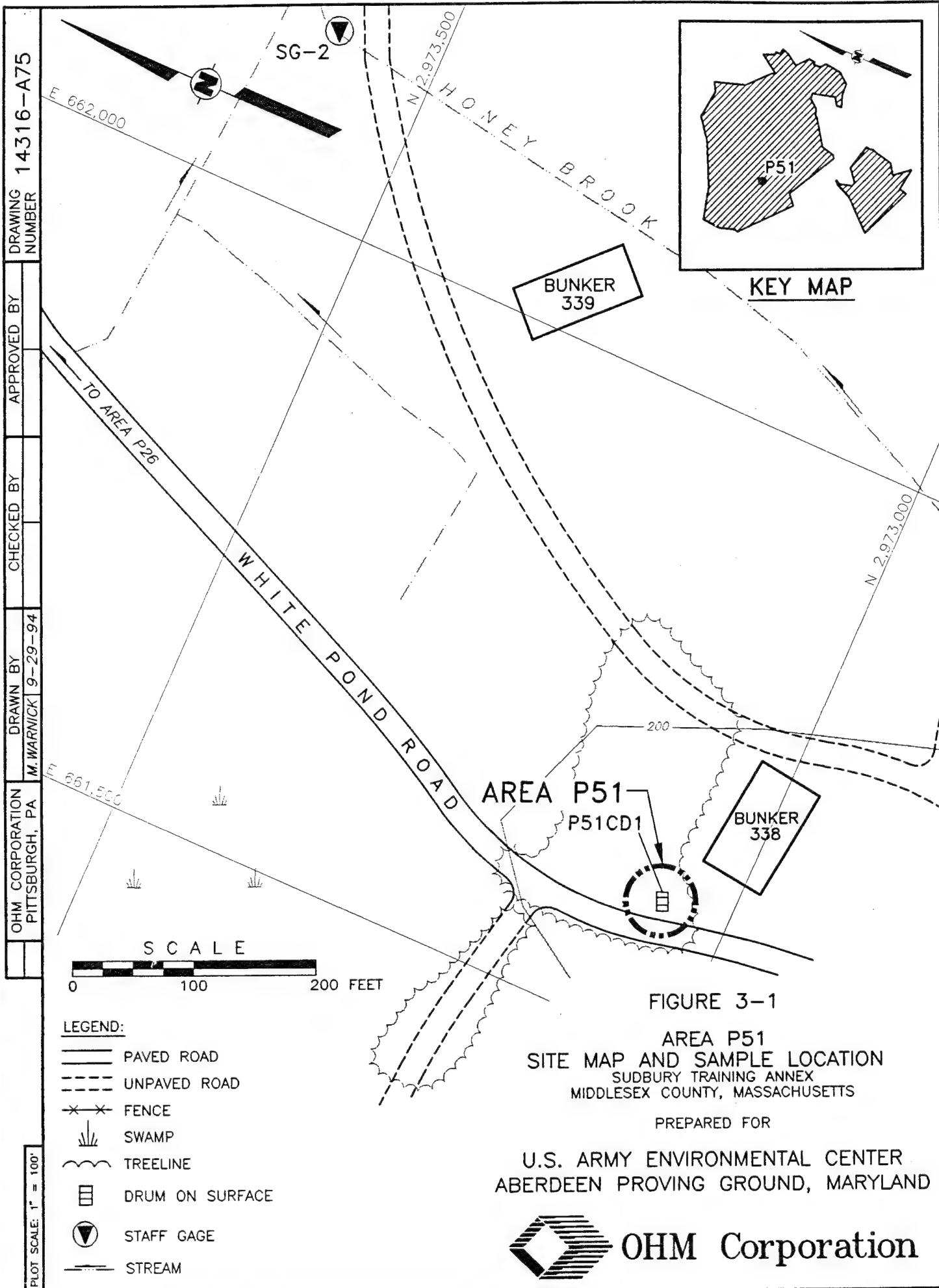


OHM Corporation

SECTION 3.0

AREA-SPECIFIC CHARACTERISTICS

Area P51 is located on White Pond Road, 1,200 feet northeast of Area P5. The access road to Bunker 328 is situated just south of the area. Figure 3-1 presents a map of the area. The surficial geology of this area has been classified as outwash plain (Hansen, 1956).



SECTION 4.0

CONTAMINATION ASSESSMENT

In 1984, Dames & Moore collected one surface sample (SW6) from a stream 500 feet southeast of the area along a bunker access road. The sample was included in the Area A5 investigation and analyzed for VOCs only. Methylene chloride, the only compound to exceed ground water standards/guidelines, was also present at similar concentrations in laboratory blank samples.

A site investigation of Area P51 was performed by OHM in 1991 and 1992. The drum located north of Bunker 338 were removed and staged at the temporary storage area assembled at the former MFFA. Scans of the soil with a PID and radiological survey meter did not reveal readings above background levels. Confirmatory soil sample P51CD1 was collected from the former drum location and analyzed for TCL volatile and semivolatile organic compounds, TCL pesticides/PCBs, TAL metals, and explosives. A summary of the positive detections for sample P51CD1 is presented in Table 4-1. Nine metals were detected in the soil sample. Copper, lead, mercury and potassium were detected at 14.4 $\mu\text{g/g}$, 77 $\mu\text{g/g}$, 0.367 $\mu\text{g/g}$ and 751 $\mu\text{g/g}$, respectively, above the concentration limits determined from off-site background samples. One unknown VOC was detected at a low concentration. DDT, DDE, DDD and dieldrin were detected above background concentration at 0.283 $\mu\text{g/g}$, 0.512 $\mu\text{g/g}$, 0.18 $\mu\text{g/g}$, and 0.117 $\mu\text{g/g}$ respectively.

Additional samples P51S01 through P51S04 were collected from a four-point grid established around the drum confirmation sample and analyzed for TCL pesticides/PCBs and TAL metals during the Phase II investigation. The sampling locations are presented in Figure 4-1. A summary of positive detections is presented in Table 4-2. The pesticides DDT, DDE, DDD, and alpha-Chlordane were positively detected in all samples. Showing no evidence of widespread contamination, the DDT, DDE and DDD detections were consistent with the prior drum confirmatory sample taken. DDT values ranged from 0.107 to 0.418 $\mu\text{g/g}$; DDE from 0.139 to 0.355 $\mu\text{g/g}$; and DDD from 0.039 to 0.152 $\mu\text{g/g}$. alpha-Chlordane, not detected in the prior sampling, was found in two of the four Phase II samples with a maximum detection of 0.044 $\mu\text{g/g}$. Several metals were also positively detected. Beryllium, copper, and lead were detected above their respective 95% UCL for background soil samples. Beryllium was detected in one of four samples at 0.234 $\mu\text{g/g}$. Copper with detections ranging from 9.25 to 26 $\mu\text{g/g}$ exceeded its 95% UCL level of 10.56 $\mu\text{g/g}$ in three of four samples. Lead with detections ranging from 45 to 70 $\mu\text{g/g}$ in all four samples. Selenium was also detected at concentrations ranging from 0.49 to 1.1 $\mu\text{g/g}$ but it does not have a background level.

Table 4-1
Area P51
Summary of Positive Detections
Soil (ug/g)

<u>Site ID</u>	<u>P51CD1</u>			
<u>Field Sample Number</u>	<u>P51CD1A</u>			
<u>Sample Date</u>	<u>19-May-92</u>			
<u>Depth (ft)</u>	<u>0.0</u>			
<hr/>				
Pesticides/PCBs				
2,2,-Bis(p-chlorophenyl)-1,1,1-trichloroethane(DDT)		0.283		
2,2,-Bis(p-chlorophenyl)-1,1,-dichloroethane(DDD)		0.18		
2,2,-Bis(p-chlorophenyl)-1,1,-dichloroethene(DDE)		0.512		
Dieldrin		0.117		
<hr/>				
BNAs				
Di-N-butyl phthalate	B	3		
<hr/>				
Volatile Organics				
UNK148		0.07		
<hr/>				
Metals				
Aluminum		5900		
Arsenic		4.68		
Copper		14.4		
Iron		7500		
Lead		77		
Manganese		24.2		
Mercury		0.367		
Potassium		751		
Vanadium		14.2		

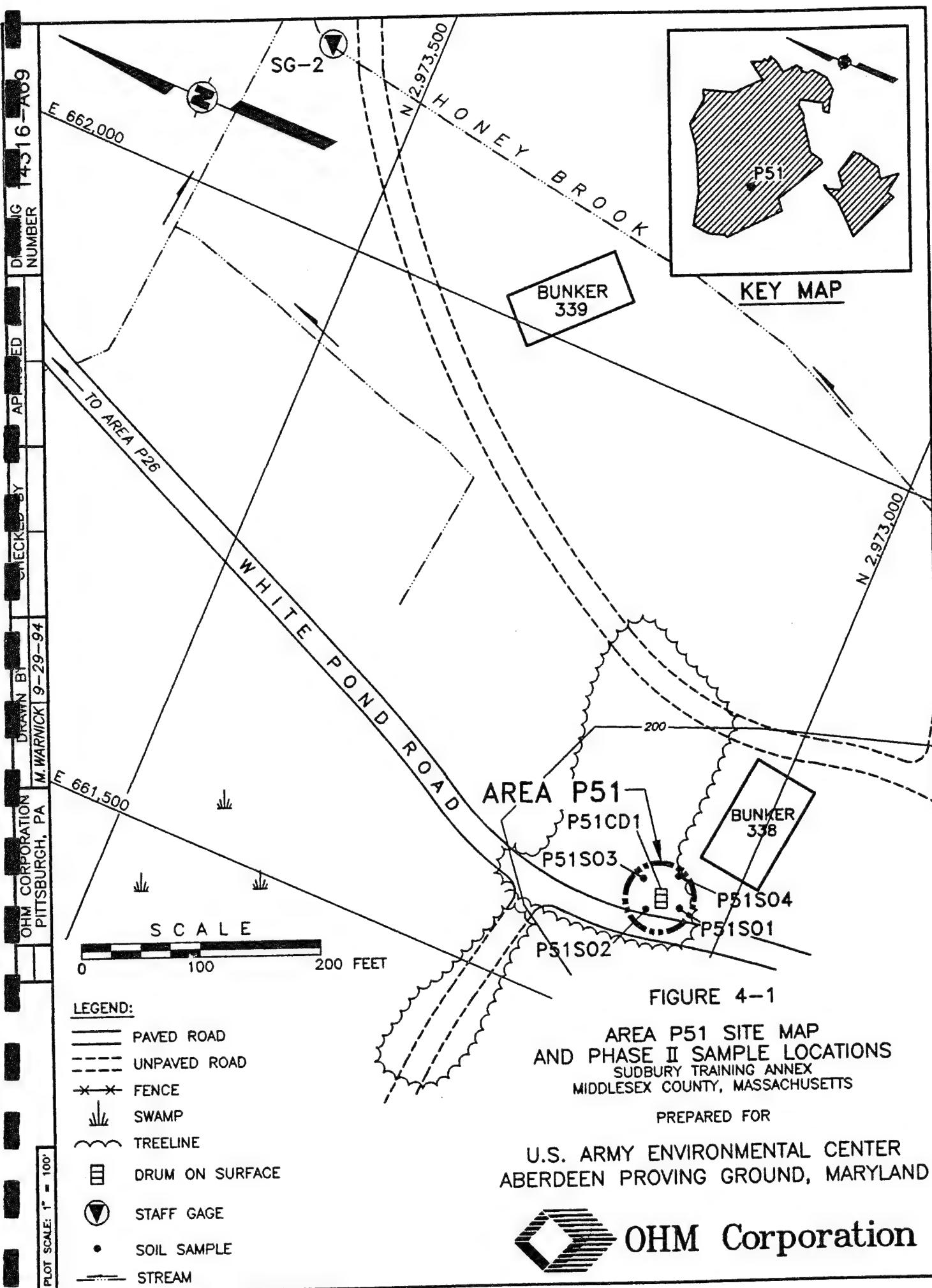


FIGURE 4-1

AREA P51 SITE MAP
AND PHASE II SAMPLE LOCATIONS
SUDBURY TRAINING ANNEX
MIDDLESEX COUNTY, MASSACHUSETTS

PREPARED FOR

U. S. ARMY ENVIRONMENTAL CENTER
ABERDEEN PROVING GROUND, MARYLAND



- OHM Corporation

Table 4-2
Area P51
Summary of Positive Detections
Phase II Soil (ug/g)

Site ID	P51SO1	P51SO2	P51SO3	P51SO4
Field Sample Number	P51SO1B	P51SO2B	P51SO3B	P51SO4B
Sample Date	01-Nov-93	01-Nov-93	01-Nov-93	01-Nov-93
Depth (ft)	0.0	0.0	0.0	0.0
Pesticides/PCBs				
ppDDD	0.11	0.039	0.152	0.047
ppDDE	0.244	0.139	0.314	0.355
ppDDT	0.418	0.107	0.365	0.238
alpha-Chlordane	0.044	ND	0.006	ND
Metals				
Aluminum	5280	7440	6320	13000
Arsenic	3.6	3.4	3.7	12
Barium	16.7	17.8	14.6	21
Beryllium	ND	ND	ND	0.734
Calcium	258	252	ND	372
Chromium	12	14.5	13.9	13.2
Copper	9.25	11.8	12.4	26
Iron	8800	5900	3200	15000
Lead	58	56	70	45
Lead	81.3	68.5	80.4	71.7
Magnesium	920	971	ND	1290
Manganese	36.3	31.5	14.3	53.4
Potassium	337	348	ND	ND
Selenium	0.49	0.58	1.1	0.99
Vanadium	14.7	12.3	12.6	22.1
Zinc	22.2	22.2	15.1	25.3

SECTION 5.0

PRELIMINARY RISK EVALUATION

Human Health

For the human health preliminary risk evaluation, all five soil samples were compared to MCP S-1/GW-1 soil standards. The pesticides DDT, DDE, or DDD do not pose a risk since none exceeded their 2 $\mu\text{g/g}$ standard. With a maximum detection of 0.044 $\mu\text{g/g}$ alpha-Chlordane also is not a risk because the values did not exceed a 1 $\mu\text{g/g}$ total chlordane standard. Although dieldrin at 0.117 $\mu\text{g/g}$ exceeded its 0.03 $\mu\text{g/g}$ standard, it does not pose a concern since it was detected in only one of five samples, not indicative of any widespread contamination.

Of the metals detected, beryllium, lead, and selenium were evaluated because MCP S-1/GW-1 soil standards exist for them. Although beryllium at 0.734 $\mu\text{g/g}$ exceeded its 0.4 $\mu\text{g/g}$ standard, it does not pose a concern since it was detected in only one of the five samples. With maximum detections of 70 and 1.1 $\mu\text{g/g}$, lead or selenium do not pose a concern since their detections did not exceed their 300 $\mu\text{g/g}$ standard. Although it was detected above its background level in four of five samples, copper does not pose a concern since its detections were within 1-700 $\mu\text{g/g}$ (Shacklette and Boerngen, 1984).

Ecological

For the ecological risk evaluation, all five soil samples were compared to eco-risk screening values (ESAT, 1994). With maximum detections of 0.418 and 0.18, both DDT and DDD do not pose an ecological concern since neither exceeded their 0.5 $\mu\text{g/g}$ screening value. Although DDE at 0.512 $\mu\text{g/g}$ exceeded a 0.5 $\mu\text{g/g}$ value, it does not pose a concern since it exceeded only by 0.012 $\mu\text{g/g}$ and was only detected in one of five samples. Alpha-Chlordane does not pose a risk because its maximum detection of 0.044 $\mu\text{g/g}$ was well below its 1 $\mu\text{g/g}$ value. With all maximum detections below the screening values of 55, 100, 200, 2 and 2 $\mu\text{g/g}$, beryllium, copper, lead, mercury, and selenium do not pose an ecological risk.

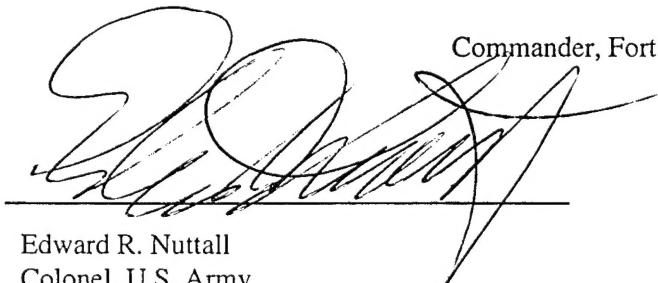
SECTION 6.0 CONCLUSION

Based on the preliminary risk evaluation of Study Area P51 (One Drum Near White Pond Road), it is concluded that no further investigation or remediation is required at this study area. Sampling following drum removal has shown pesticide and metals concentrations below and within human health and ecological screening values.

The decision of no further action is protective of human health and the environment because no evidence of possible contamination requiring remediation introduced by the drum was identified in the field investigation.

SECTION 7.0 DECISION

On the basis of study at Area P51, One Drum Near White Pond Road, there is no reason or evidence to conclude that activities at this location have caused significant environmental contamination or pose a threat to human health or the environment. The decision has been made to remove Area P51 from further consideration in the Installation Restoration Program and the Comprehensive Environmental Response, Compensation, and Liability Act, as amended.



Commander, Fort Devens

Edward R. Nuttall
Colonel, U.S. Army
Commanding

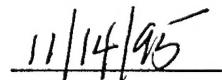


Date

U.S. Environmental Protection Agency
Region I, Federal Facilities Office



Ira Leighton
Chief
Superfund II Branch



Date

Concur

Non-concur (please provide reasons)

SECTION 8.0 REFERENCES

- Barnes, D.F., 1956, "Seismic Surveys of Maynard Ordnance Test Station, Maynard, Massachusetts," USGS, Open-File Report.
- B.H. Keith Service, 1983, "Land Cover of the Fort Devens - Sudbury Training Annex," U.S. Army, Sudbury, Massachusetts.
- Dames & Moore, November 26, 1986, "Remedial Investigation Report", Contract No. DAAK11-84-D-0002, submitted to USATHAMA, Aberdeen Proving Ground, Maryland.
- Hansen, W.R., 1953, "Late Tertiary and Pleistocene Drainage Changes in the Hudson and Maynard Quadrangles, Massachusetts," Journal of Geology, Vol. 61, No. 4, p. 353-362.
- Hansen, W. R., 1956, "Geology and Mineral Resources of the Hudson and Maynard Quadrangles, Massachusetts," USGS, Geological Survey Bulletin 1038.
- OHM Corporation, January 1992, "Final Master Environmental Plan for the Fort Devens Sudbury Training Annex, Middlesex County, Massachusetts."
- OHM Corporation, July 1993, "Draft Final Site Investigation/Remedial Investigation Report for the Fort Devens Sudbury Training Annex, Middlesex County, Massachusetts."
- Perlmutter, N. M., 1962, "Ground-Water Geology and Hydrology of the Maynard Area, Massachusetts," USGS, Water Supply Paper 1539-E.
- USATHAMA, May 1980, "Installation Assessment of U.S. Army Natick Research and Development Command, Report 170."

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